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GALAPAGOS ISLANDS

SURVEYED BY CAPTAIN HORN, R.F.Z. ROYAL NAVY
AND THE OFFICERS OF H.M.S. BEAGLE

1836

Dark broken by brown massive. A day & dark. Come
a small rock a sand in shells in small & above
The figures on the land show the height in feet
H.W.T. High Water. Full and change of the moon.



THE GALAPAGOS AND CHARLES DARWIN

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THROUGHOUT the more than half a century he lived after his return from the year-long California Academy of Sciences expedition to the Galápagos Islands in 1905-6, Joseph R. Slevin, late curator of herpetology in the Academy, was a devoted student of the archipelago's human as well as its natural history. In 1931 he published the *Log of the Schooner "Academy" on a Voyage of Scientific Research to the Galápagos Islands, 1905-1906* (Occasional Papers of the California Academy of Sciences, XVII). He made subsequent voyages to the Galápagos and also went twice to Australia, collecting reptiles and documentary evidence of Galápagos landfalls in the course of Pacific voyages. His last journey of discovery was to Spain, France, and Britain, for research in various archives. At his death in 1957, he left the completed manuscript of his book, *The Galápagos Islands: A History of Their Exploration*, which is now in press as No. XXV of the Occasional Papers series. Some introductory parts are presented here, with a few illustrations from the book, and others kindly loaned by Mr. and Mrs. Elmer Ainslie Conway of Berkeley, sometime residents of the Galápagos Islands. . . . "Expedition!" is the title of a new TV show now on the Los Angeles area air, with P. T. Furst as co-producer and explorer Norman Dyrhrenfurth as host. A production of Insight, Inc., the program deals exclusively with major expeditions by reputable scientific organizations, museums, universities, governments, and other private and public institutions concerned with exploration. Furst's story here is about a man who explored the world of 35,000,000 years ago. . . . John L. Blackford, naturalist, writer, and photographer of Libby, Montana, is author of the recent book *Western Wonderlands*. . . . We continue the wanderings through Australia's Victoria state by Patricia Bailey Witherspoon, who writes, makes lecture tours, and does research in places sometimes distant from her Denver home and family. . . . Our nature columnist, Dr. Arthur C. Smith of the California Public Health Department, would like to have readers—any age—ask him questions. Turn-about is fair—and all that.

D.G.K.

A JOURNAL OF
NATURE AND MAN
IN THE
PACIFIC WORLD

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THE COVER

LOOKING FIERCE, which he isn't, and prehistoric, which he is, the giant land iguana of the Galápagos was photographed by an American service man stationed in the islands during World War II, whom we regret not being able to credit by name. It appears by courtesy of Mr. and Mrs. Elmer Ainslie Conway of Berkeley. (See pages 4-10)

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The neighbors, next block south

Wildlife of Mexico: The Game Birds and Mammals. By A. Starker Leopold. Illustrated by Charles W. Schwartz. Foreword by Enrique Beltrán. University of California Press, Berkeley and Los Angeles. 1959. viii + 568 pp., 194 figs., 2 colored plates, many unnumbered illus. \$12.50.

Mexico, our neighbor to the south, is a land of friendly people, scenic beauty, and diverse forms of plant and animal life. Biologically it contains a broad representation of temperate and tropical elements. Among these elements are species of vertebrates which man for generations has been hunting and trapping for food and sport. The native populace, however, has given little thought to the utilization of these natural resources on a sustained yield basis.

It was with this latter thought in mind that Dr. A. Starker Leopold began in 1947 to accumulate information on Mexican game species to be presented in book form. During the succeeding years, with help provided both by American and Mexican organizations, as well as many co-workers, he traveled, observed, and collected throughout the various parts of Mexico. Some of these travels were made by plane or automobile, others were by pack mule, ox cart or even on foot.

The author is particularly well qualified in the field of wildlife management. He is Professor of Zoölogy and Associate Director of the Museum of Vertebrate Zoölogy at the University of California and President of the California Academy of Sciences.

Wildlife of Mexico opens with a foreword by Dr. Enrique Beltrán, Director of the Instituto Mexicano de Recursos Naturales Renovables and one of the foremost proponents of conservation in that country. The book is logically divided into three parts. Part I, "The Wildlife Resource and Its Management," introduces the reader to the general physical features and vegetation zones of

Mexico which are so important in vertebrate distribution. The present status and utilization of game birds and mammals are considered and the author devotes a chapter to the future of wildlife in Mexico in which he makes a number of important specific recommendations. Emphasis in management is placed not so much on restrictive hunting regulations and predator control as upon the development and maintenance of the proper habitats for game species. This is the biological approach.

Parts II and III are concerned with accounts of the various so-called game species of birds and mammals. Since a great many kinds of vertebrates are taken for food in Mexico the problem of determining which species should be classified as game was a difficult one and, as the author states, many arbitrary decisions had to be made. For birds priority was given to species having resident status, those widely hunted, and those of sufficient size to justify being classified as game. The principal criterion for the inclusion of mammalian species was size. All mammals of appreciable size are included.

Each of the more than one hundred and fifty species of birds and mammals treated is capably illustrated by the drawings of Charles W. Schwartz. There are numerous photographs depicting habitats, vegetation zones and land utilization, as well as distribution maps and two colored plates.

All in all, *Wildlife of Mexico* is the book containing a wealth of information about the game of a country in which many species are hunted but about which little has heretofore been published. The author, the illustrator and the University of California Press, as well as many persons whose names are mentioned in the acknowledgments, deserve commendation.

ROBERT T. ORR

(More REVIEWS on pages 31-33)



Jaguar and coatimundi, by Charles W. Schwartz, are on the jacket of *Wildlife of Mexico*, which was designed by Betty Leopold, the author's wife. (Courtesy University of California Press)

NOVEMBER-DECEMBER 1959

BOOKS FROM CALIFORNIA

ZULU JOURNAL

Field Notes of a Naturalist in South America

By RAYMOND B. COWLES

An account of life in Natal's Hluhluwe valley that is both humane and scientific, showing how overpopulation may denude a land. 281 pages. \$6.00

WILDLIFE OF MEXICO

The Game Birds and Mammals

By A. STARKER LEOPOLD

Detailed descriptions of appearance, range, habits, and ecology for more than 150 species of Mexico's varied fauna. Just published, the book has 194 illustrations, 576 pages. \$12.50

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ON 17 SEPTEMBER 1835 Charles Darwin landed from H.M.S. *Beagle* on Chatham Island of the Galápagos, and the theory of evolution took another small, unconscious step forward.

"One night I slept on shore," Darwin wrote in his *Journal** published four years afterwards, "on a part of the island where some black cones—the former chimneys of the subterranean heated fluids—were extraordinarily numerous. From one small eminence, I counted sixty of these truncated hillocks, which were all surmounted by a more or less perfect crater. The greater number consisted merely of a ring of red scoriae, or slags, cemented together: and their height above the plain of lava, was not more than from fifty to a hundred feet. From their regular form, they gave the country a *workshop* appearance, which strongly reminded me of those parts of Staffordshire where the great iron-foundries are most numerous."

Commenting, later, upon the Galápagos, "though standing in the Pacific Ocean," being "zoologically part of America," Darwin observes that, "if this character were owing merely to immigrants from America there would be little remarkable in it; but we see that a vast majority of all the land animals and that more than half of the flowering plants are aboriginal productions. It was most striking to be surrounded by new birds, new reptiles, new shells, new insects, new plants," which yet reminded him of corresponding types he had recently seen on the South American continent.

Then comes Darwin's most significant observation, with respect to his eventuating theory of the origin of species: "I have not as yet noticed by far the most remarkable feature in the natural history of this archipelago; it is that the different islands to a considerable extent are inhabited by a different set of beings." He cites the various classic examples of "the tortoise, mocking-thrush, finches, and numerous plants," varying from island to island, and concludes on this note of qualified wonder: "Reviewing the facts here given, one is astonished at the amount of creative force, if such an expression may be used, displayed on these small, barren, and rocky islands; and still more so at its diverse yet analogous action on points so near each other."[†]

Students of the evolution of Darwin's thinking differ as to the weight of the Galápagos experience in sending the theory of evolution on its way.

"If Darwin ever found himself, on the *Beagle*,

* *Journal of Researches into the Geology and Natural History of the Various Countries Visited by H.M.S. Beagle*, by Charles Darwin (1839). Facsimile Reprint of the First Edition. Hafner Publishing Company, New York—London. 1952. (p. 455.)

† *The Voyage of the Beagle*, by Charles Darwin. Abridged and edited by Millicent E. Selsam. Harper & Brothers, New York. 1959. (Based on the *Journal of Researches*, etc., revised edition of 1845, which, in the passages relating to the Galápagos at least, differs markedly from the 1839 edition. Perhaps significantly, Darwin put more into his revision of that which bears on the theory shaping in his mind while he was writing in retrospect on the voyage of the *Beagle*.)

thinking about the problems of species," Gertrude Himmelfarb says in *Darwin and the Darwinian Revolution*, "it was to confirm his original impression that species, being immutable, had originated in special acts of creation. Only after his return did he seriously begin to consider the possibility that species were not immutable and had gradually changed and evolved in the course of time." When did his conversion come? "The date . . . is almost certain. The first notebook embodying his new views, dated July 1837 to February 1838, contains the note: 'In July opened first notebook on Transmutation* of Species. Had been struck from about the previous March on character of South American fossils, and species on Galápagos Archipelago. These facts (especially latter), origin of all my views'."

Professor Loren Eiseley, in *Darwin's Century*, rests on Darwin's still later hindsight on his own thinking. "By the time that the first edition [1839] of the *Journal of Researches* was published, Darwin, when he came to the subject of the Galápagos, was willing to throw out several evolutionary hints. 'There is a rat,' he records, 'which Mr. Waterhouse believes is probably distinct from the English kind; but I cannot help suspecting that it is only the same altered by the peculiar conditions of its new country.' The finches in particular fascinated him. They differed remarkably [from island to island] in the structure of their beaks. . . . Here, in the Galápagos, Darwin was brought up short by a new series of facts: variation in form under isolation with the physical environment remaining precisely the same. As Darwin himself was later to observe, 'One might really fancy that from an original paucity of birds in this archipelago one species had been taken and modified for different ends' [A *Naturalist's Voyage Around the World*, 2nd ed., 1889]. Darwin at last was face to face with the greatest of the evolutionary mysteries. If life varied on the individual islands of an archipelago subjected to the same climatic conditions, what determined this variation?" It is in the first edition (1859) of *The Origin of Species* itself that Eiseley finds a sentence referring back to the Galápagos observations, than which, in his judgment, "No clearer statement of the significance of the Galápagos experience could have been made by Darwin."

One thing seems clear to me in all this—and perhaps it is enough to be said in an attempt at resolution. It is that Darwin himself seems to have harked back to the *Beagle* experience, and especially to the Galápagos sojourn as its high point, with increasing fervor and certainty on the score of its crucial part in the shaping of his ideas. Darwin himself gives us sufficient grounds, this year as we celebrate the *Origin's* centenary, to hail the Galápagos Islands—if any geographical point can be singled out—as the most probable workshop in which the design for the molding and casting of the Darwinian theory of evolution first began to appear dimly on the drawing board.

* "The words 'evolve' and 'evolution' do not actually appear in Darwin's early writings, including the first few editions of the *Origin*." (Himmelfarb, note 1 to chapter 7.)

It is very satisfying, for the sake of historical clarity, to be able to pin down the facts about any event of turning-point significance along the road of our intellectual progress. The year of *The Origin of Species*, 1859, was one of the main turning points, from whatever stations in space or time we reached it. And we have come a long way from it: Evolution has evolved since Darwin. Is the time now becoming ripe for another turning?

In his conclusion of *Darwin's Century* Loren Eiseley suggests such a turning which, in the light of current trends, may seem altogether unlikely but which, I think, would set mankind squarely on the road toward goals already envisioned as both desirable and possible. Let me try to put together, with the help of quotes, a brief of Eiseley's thinking, as I understand it, on a new direction, a new world's beginning.

The Darwinians, in establishing man as an animal species, concentrated upon his past, threw a shadow over his unique *human* nature. But he is not bound by a blind, instinctual, animal evolution. He alone on this planet contains "infinite possibilities of good and evil. . . . He is . . . a reservoir of indeterminism. He represents the genuine triumph of volition, life's near evasion of the forces that have molded it. In the West of our day only one anachronistic force threatens man with the ruin of that hope. It is his confusion of the word 'progress' with the mechanical extensions which represent his triumph over the primeval wilderness of biological selection." He fails "to see that the triumph of the machine without an accompanying inner triumph represents an atavistic return" to the old biological struggle. . . . "The enormous wealth now poured by modern governments into the development of implements of war reveals a kind of leviathan echo from the Age of Dinosaurs. . . . Transcendence of self is not to be sought in the outer world or in mechanical extensions. These are merely another version of specialized evolution. They can be used for human benefit if one recognizes them for what they are, but they must never be confused with that other interior kingdom in which man is forever free to be better than what he knows himself to be. It is there that the progress of which he dreams is at last to be found. It is the thing that his great moral teachers have been telling him since man was man. This is his true world; the other, the mechanical world which tickles his fancy, may be useful to good men but it is not in itself good. It takes its color from the minds behind it and this man has not learned. When he does so he will have achieved his final escape from the world which Darwin saw and pictured."

A moratorium on mechanical development is too impracticable even to suggest; it would have to be universally agreed upon and extremely selective. But must we continue to evolve extensions of our animal nature in the shape of bombs and missiles? Must we conquer outer space before we have even begun to realize the potential loftiness of our inner nature—the ultimate goal of human evolution? We can choose our next turning, but we haven't got forever to make up our minds.

D.G.K.

Darwin Centennial reading

Darwin's Century: Evolution and the Men Who Discovered It. By Loren Eiseley. Doubleday & Company, Inc., Garden City, New York. 1958. xvii + 378 pp., endpaper portraits. \$5.00.

It took many men and much thinking to pave the way for Darwin and *The Origin of Species*, and the event of 100 years ago now being celebrated by the publication of many special books naturally set in motion a still continuing train of thought and motivated the life-work of countless other men. The background, the event, and the consequences and implications are clearly told in this book by the head of the University of Pennsylvania's Department of Anthropology.

Darwin and the Darwinian Revolution. By Gertrude Himmelfarb. Doubleday & Company, Inc., Garden City, New York. 1959. 480 pp., endpaper map. \$5.95.

Dr. Himmelfarb's contribution to the Darwin centennial list deals more intensively with our hero himself. It might be called a biography of Darwin's thinking, its ancestry, its life, and its progeny. Darwin to her is "hero of a conservative revolution."

Darwin, Wallace and the Theory of Natural Selection, including the Linnean Society Papers. By Bert James Loewenberg. Arlington Books, Cambridge, Massachusetts. 1959. 97 pp., numerous drawings and engravings. \$5.00.

The author of this gem of a little book is a Sarah Lawrence College professor of history and chairman of the international Darwin Anniversary Committee. The book commemorates the famous 1 July 1858 meeting of the Linnean Society at which the theory of natural selection was previewed by the reading of the Papers of Charles Darwin and Alfred Russel Wallace.

The Voyage of the Beagle. By Charles Darwin. Abridged and Edited by Millicent E. Selsam. Harper & Brothers, New York. xxiv + 327 pp., line drawings. \$3.95.

Author of many nature books for younger readers, Mrs. Selsam has done a commendable job in boiling down the lengthy *Journal of Researches* (1845 revised edition) to a size suitable for readers—any age—of a less leisurely century. Her husband, artist Anthony Ravielli, has enlivened the work with his free-style pen drawings and maps. The text is Darwin's. Only the length has been changed.

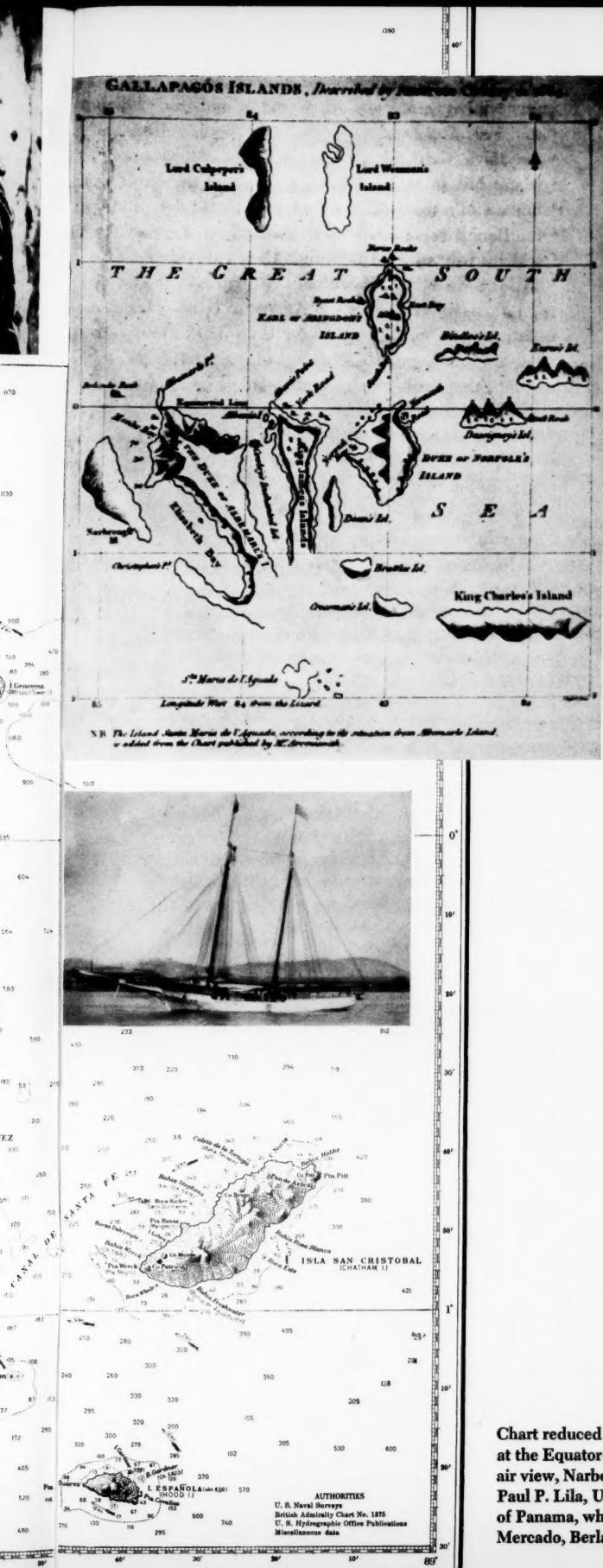
The Road to Man. By Herbert Wendt. Doubleday & Company, Inc., Garden City, New York. 1959. 431 pp., profusely illustrated. \$5.95.

Mankind in the Making: The Story of Human Evolution. By William Howells. Doubleday & Company, Inc., Garden City, New York. 1959. 382 pp., numerous line drawings. \$4.95.

These two handsome big books, by an eminent science writer-editor and a Harvard professor of anthropology, respectively, give the whole thrilling story of the evolution of animal life on earth, from amoeba to man. Dr. Howells has included the exciting accounts of the discoveries of fossil man, and their discoverers.

Natural Selection and Heredity. By P. M. Sheppard. Philosophical Library, New York. 1959. 212 pp., drawings. \$6.00.

This somewhat technical English book deals with recent ideas on the mechanism of evolution in the light of modern genetics, bringing the theory of natural selection up to date.



Islands of The Tortoise

JOSEPH R. SLEVIN

THE GALAPAGOS ARCHIPELAGO, or Archipiélago de Colón as it is called by the Government of Ecuador, was annexed by that country on February 12, 1832. The history of these islands remained more or less obscure to the world for many years after their discovery as they had no strategic value in the scheme of events until the construction of the Panama Canal. Then at once they became of the greatest importance to the United States as a base for the protection of that waterway in time of war, and were used as such in World War II. . . .

The archipelago, consisting of some fifteen islands and numerous islets and rocks, extends from Latitude 1°40'N. to 1°36'S. and from Longitude 89°16'58" to 90°1'W., the nearest point to the mainland being Mt. Pitt on Chatham Island, which is 502.5 miles N. 87°50'W. of Marlinspike Rock, Cape San Lorenzo, Ecuador. The Equator passes through the northernmost volcano of Albemarle Island.

The islands themselves are in reality immense lava piles projecting out of the ocean, some with perfectly formed craters, and there are hundreds upon hundreds of minor ones together with fumeroles and vents scattered over the landscape. Great lava flows extend from the crater rims to the sea. These, the most striking features of the landscape, vary greatly, some being composed of huge black or brown slabs that have the appearance of age, while others are rough, black boulders that appear to be of recent origin, so much so that one would think they had hardly cooled.

Origin

The origin of the islands is still a question of debate. Whether they are oceanic islands thrust up from the ocean bed or whether they were formed by subsidence has claimed the attention of the most renowned naturalists and geologists from the time of Darwin's voyage on the *Beagle* to the present day. When Darwin, Baur, Agassiz, and many other scholars pursued their studies, they did not have the advantage of those who came after them, being entirely unaware that Pliocene fossils existed on certain of the islands; nor

Chart reduced from H.O. 1798 (ed. of Oct. 1946) to scale 1:1,320,000 (approx.) at the Equator—borders, title, etc., rearranged. Insets (LEFT) U. S. Frigate *Essex*; air view, Narborough crater lake, tiny crater and lake within it (courtesy Captain Paul P. Lila, USAAF). (RIGHT) The Very Rev. Fray Tomás de Berlanga, Fourth Bishop of Panama, who discovered the Galápagos (wood carving, Church of Santa María del Mercado, Berlanga, Spain); first chart of the islands, 1684; schooner *Academy*.

did they have the flora and fauna at hand that enabled later students to draw their conclusions.

There were two distinct schools of thought on the subject. Such noted scientists as Darwin, Wallace Agassiz, Wolf, and many others were strong advocates of the oceanic theory, while Ridgway, Gadow, Van Denburgh, Barbour, and Baur were in favor of subsidence.

It was, however, more or less a general opinion among many that there was a Galápagos land mass extending much closer to the coast than the islands do today, but not necessarily a direct connection with the mainland.

The late Dr. John Van Denburgh of the Academy's staff made an exhaustive study of the reptiles and came to the conclusion that at one time there was a Galápagos land mass that gradually broke up to form the present archipelago. . . .

Description of the islands

Albemarle, shaped somewhat like a boot, is the largest of the group, being approximately 75 miles in length and 45 in breadth at the southern end, the widest part. Narborough, James, Indefatigable, Chatham, Charles, Bindloe, Abingdon, Tower, and Hood are next in size and importance, while the remainder range from islets of a mile or less to mere rocks.

The mountains of the Galápagos are best represented on Albemarle and Narborough islands, the former having five large volcanoes, the most massive of which, Villamil Mountain, is 4,890 feet. The crater, somewhat oval in shape, is approximately five miles in diameter, and the area about the rim is open country with a scattering of small trees. As it is often covered with clouds, there is considerable moisture, resulting in a luxuriant growth of grass furnishing

marvelous grazing land for the wild cattle which range about the southern slope above the tree belt. The base of the mountain is surrounded by barren lava beds.

Iguana Cove Mountain, 5,540 feet in height, is of a somewhat different type. The southern slopes, being exposed to the prevailing southerly winds, are covered by a dense growth of vegetation from the crater rim to the shoreline, while the northern ones are barren. The line of demarcation between lava flow and vegetation is so remarkably distinct that it is the first thing that strikes the eye while sailing along Albemarle's western coast.

Cowley Mountain, 3,650 feet in height, is of still another type, the lower slopes being covered by pumice with a very scant growth of vegetation up to the vicinity of the crater rim. Here a wide belt of sword grass forms an impenetrable barrier surrounding the crater rim.

The two northern mountains, Tagus Cove, 4,300 feet, and Banks Bay, 5,500 feet, are much more barren in appearance, although there is sparse vegetation at their lower levels. Neither of these mountains is as spectacular as the southern ones are, though like them they have well-formed craters.

Narborough, a huge mountain of lava, is no doubt the most barren and least known of the larger islands, the greater part of it being a series of black lava flows with only small streaks of vegetation despite the most violent eruptions that have taken place. The island rises to a height of about 4,500 feet and has a lake in the crater floor which in turn has a small crater with a lake of its own. As no anchorages were marked on the earlier charts, its waters were given a wide berth by navigators in general and landings were made from small boats while the vessel hove to off

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shore or lay at anchor in Tagus Cove across the strait. Mr. Templeton Crocker's yacht *Zaca*, while on an expedition for the California Academy of Sciences, was the first vessel to chart an anchorage on Narborough. It was named California Cove.

The great lava flows of Albemarle and Narborough vary considerably in character, some being composed of huge black or brown slabs that have the appearance of great age; others appear to be of very recent origin.

Two small islands of a distinct type, Duncan and Tower, have well-formed craters, the former with its lava flows covered with lichens, giving the appearance of great age. Its crater floor is composed of red volcanic ash. Tower Island, by contrast, is composed of black lava and has a crater lake of brackish water.

The other larger islands, Indefatigable, James, Chatham, Charles, and Hood, are all of a somewhat different type, the main craters having broken down to the extent that they are no longer well defined, or even visible. The tops of all except Hood, which is a very low island only about 650 feet in height, are covered with vegetation, and Chatham and Charles have open areas in the vicinity of their summits. . . .

The tops of all the islands and of all the volcanoes have now been reached on foot by some or several members of the Academy's various expeditions.

Mr. Rollo H. Beck, chief of the Academy's expedition of 1905-06, climbed to the top of Narborough and reported seeing the lake in the crater now shown on H.O. Chart No. 1798 from the survey of the Galápagos made by the U.S.S. *Bowditch* in 1942.

The top of Indefatigable was reached by the members of the Templeton Crocker expedition to the Galápagos Islands in the interests of the Academy. Mr. John Thomas Howell, the Academy's Curator of

Botany, gave an excellent description of the ascent in the *Sierra Club Bulletin* for August 1942 (vol. 27, no. 4).

When the United States Army established its air base in the Galápagos, much of the area was photographed from the air. From these aerial surveys it was possible to make additions and corrections to the survey of 1835, which was in use until it was replaced by the *Bowditch* survey. Among the changes made were the listing of the crater lake on Narborough and the dropping of the supposed central crater on Indefatigable Island. The need for this addition and correction first became known through the Academy's explorers who conquered the mountains on foot and were the first to see the crater lake of Narborough and to give a proper description of the top of Indefatigable. The latter island had defied several attempts to reach its summit.

Water

For all the visitors to the Galápagos, water seems to have been one of the greatest problems, and from the accounts of the early navigators they spent much time in search of it, mostly with little success. On rare occasions, when a copious rainfall occurred, a few depressions in the lava beds or the bottom of the arroyos were found to contain small amounts of water, but a generous supply where a ship could be watered from along the coast is not existent. There is one spot, however, on the east coast of Chatham Island (Fresh-water Bay) which might have saved many an early visitor from a shortage of water if it had been discovered. A small stream trickles down from some permanent ponds on the plateau and finds its way to a basin in the rocks just above the tide line. . . .

On Albemarle Island, just above half a mile south

◀ Indefatigable's highlands, southeasterly from the remnants of a crater rim at the highest point, 2,835 feet above sea level, as members of the Crocker Expedition saw them in 1932, thus proving the non-existence of the huge central crater reported on the *Beagle* charts of 1835 and removed from the U.S.S. *Bowditch* 1942 charts. (Joseph R. Slevin's book)

► One of the few bodies of fresh water, Laguna de los Tijeretas on Charles (Floreana) Island. (Mme. Paulette Rendón courtesy Mr. and Mrs. Elmer Ainslie Conway, Berkeley.)





of the mouth of Tagus Cove, a small basin in the tufa collected about 40 to 50 gallons per day from underground seepage, and the Academy's expedition of 1905-06 watered the schooner from this basin while at anchor in Tagus Cove. . . . The grasslands about the top of (Villamil) Mountain have waterholes with a constant supply of good drinking water, but of course this is an impossible source as far as watering a ship is concerned.

Chatham Island also has good fresh water in some parts of the plateau and water can be hauled down by ox team in case of necessity, though it is not a very practical method of watering a ship. . . .

During the rainy season, at the northern end of James Bay on James Island . . . water collects in some depressions in the lava. It was here that the buccaneers invariably searched for water and, at times, found it in small quantities as they did in similar places elsewhere on the larger islands.

No one need die of thirst in the higher portions of Indefatigable as the summit of that island is covered practically daily by clouds which create sufficient moisture to fill depressions in the lava and make possible its dense vegetation. Again, however, this does not help the thirsty mariner at the shoreline. . . .

Native fauna

While the neighboring continent of South America, only 500 miles away, harbors birds of the most gorgeous plumage in its tropical forests and has a varied and wonderful mammal population, the avifauna of the Galápagos is most sombre, the little crimson fly-catcher and the beautiful pink flamingo giving the only touches of real color.

Of the Galápagos fauna, the gigantic land tortoises from which the islands get their name—*galápago* being the Spanish for tortoise—naturally claim first attention. These huge and grotesque reptiles have been found living in no other place in the world except the [Seychelles and other] islands off southeast Africa [in the Indian Ocean] where they no longer exist in the wild state as they do in the Galápagos. Whether the Galápagos tortoise can survive is a question. In the past they furnished a ready supply of fresh meat for the early voyagers, especially for the whalers who frequented the Pacific, as the waters around the Galápagos were one of their favorite cruising grounds. Tortoises were removed by the thousands during the long period of whaling activity which started in the early 1790's and continued without decline until the 1860's. At the present time these tortoises are hard pressed by their enemies, the wild dogs being the worst if we except man. While the dogs kill the fully grown tortoise, the rats and hawks destroy the young as soon as they hatch from the egg, so that the percentage of survivors from a nest is undoubtedly

small. Certainly the tortoise has an uphill battle to survive and is barely holding its own.

The land iguana, formerly living in large colonies on James, Indefatigable, and Albemarle islands, is extinct on the two first and very scarce on the last, a few scattered ones still surviving at the north end of Albemarle where the dogs, owing to the extreme roughness of the terrain, have not penetrated to any great extent. Colonies on Barrington and South Seymour [Baltra], the other islands they are known to inhabit, have been successful in surviving, man being their worst enemy.

The sea iguana, found nowhere else in the world, is unique in that it is the only reptile known that depends solely on the sea for its food. This inhabitant of the Galápagos is abundant and is probably the native species that stands the best chance for survival. Living along the rocky coasts where their food, a species of sea lettuce, is found, they can take to the water and swim to outlying rocks for safety, their only risk that of being caught by a shark while en route. A great danger, however, which these iguanas have to face is that of having their nests destroyed by dogs, rats, or pigs.

Excluding a species of sea snake, which has been seen in Galápagos waters, and is of course venomous, a few species of lizards and harmless snakes complete the reptile fauna.

Bird life is abundant on the islands and there are various types of land birds, such as hawks, owls, and flycatchers, together with the little finches that so excited Darwin's curiosity. Among the water birds are ducks, herons, and the beautiful pink flamingos which are found in the lagoons along the coasts. Like many other isolated islands, the Galápagos furnish nesting sites for thousands upon thousands of sea birds. One of these, the flightless cormorant, like the sea iguana is found nowhere else in the world.

The mammal and insect faunas, to say the least, are both inconspicuous, the former consisting of a few species of bats and mice, as well as rats, the last being found on most, if not all, of the rocks that in any sense can be called islands. The insect fauna consists of various types of beetles and the like, together with a few species of butterflies and hawk-moths, not one of which attains the beautiful coloring of many of the species on the adjacent mainland.

Native faunas throughout the world are having a struggle to survive and that of the Galápagos is not an exception. Besides having to contend with man for 400 years and more, natural and introduced enemies make survival so precarious that even though the government of Ecuador has wisely made the archipelago a wildlife refuge, is a question whether much of its native animal life will survive. It may be that the small land birds will go completely, as the cats increase,



(ABOVE) Life and death of the Galápagos tortoise. (From Joseph R. Slevin's book, courtesy California Academy of Sciences; the lower photo by Rollo H. Beck on the *Mary Sachs* expedition of 1901). (BELOW) A land iguana. (Hancock Pacific Expeditions, courtesy of the Conways)



Darwin Centennial monument set up at
Wreck Bay, Chatham Island, 21 September 1935,
to commemorate the young naturalist's landing.

through the southern group of the Galápagos, bathes their shores with the cool waters of the Antarctic, creating an ideal climate. The Panama Current, which is several degrees warmer, encircles the northern group of islands, but these, too, have a climate that is delightful.

The seasons are variable and uncertain, but spring may be considered as the period between January and June, while July to December may be considered the dry season, although at high elevations, which are usually covered with clouds, there is considerable moisture. . . . The prevailing southeasterly winds support vegetation on the higher elevations and in some cases, as at Iguana Cove, it extends to the beach line. Despite the tremendous eruptions that have taken place on Narborough Island, there is a considerable green zone on the western slopes.

Discovery

Whether the Inca king, Tupac Yupanqui, who is credited by Sarmiento with having discovered the Galápagos Islands, really did so is a question. As the Incas possessed no written language, the story of the voyage of the Inca king is purely legendary. . . .

History records the discoverer of the Galápagos as Fray Tomás de Berlanga, the Bishop of Panama. He was born in Berlanga, Spain (the date uncertain), and died in the town of his birth in 1551. . . . In 1533 Fray Tomás . . . became the fourth Bishop of Panama.

Spanish conquests in the New World now saw the Empire of the Incas fall to Pizarro and his lieutenant Diego de Almagro, who extended their conquests farther southward, bringing more territory into the diocese of Bishop Tomás.

Rumors of dissension between the conquerors having reached the ears of Emperor Carlos V, he issued a decree dated July 19, 1534, giving the power to Fray Tomás de Berlanga to arbitrate any dispute between them and ordering the bishop to Peru on his mission. Leaving Panama on February 23, 1535, his vessel was caught in one of the calms so prevalent in those regions, and the equatorial current, setting his vessel to the westward, carried him out to the Galápagos. His letter to his Emperor is the first document ever written pertaining to them. This most interesting letter . . . contains the first mention of the giant land tortoises inhabiting the Galápagos and from which the archipelago gets its name; the tameness of the birds which has been remarked upon by most all visitors thereafter; and the grotesque iguanas which constitute another remarkable feature of a most unique fauna. Little did the reverend bishop know that he had discovered a zoological paradise that was to claim the attention of the world's leading scientists for well over a hundred years and which still continues to do so.

Climate

Though the Galápagos are situated directly on the Equator, . . . the islands have a delightful climate, the thermometer rarely going above 80°F. The Humboldt Current, sweeping up from the south, turns westward when it reaches the Ecuadorian coast and, passing

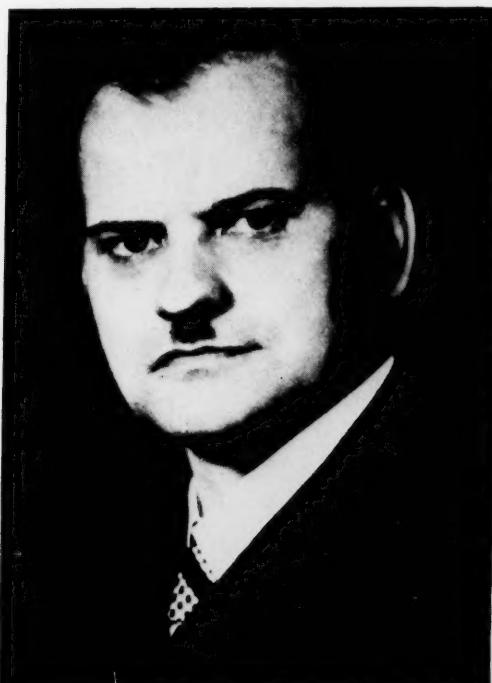
P. T. FURST

The Oligocene World of Georg Statz

PHOTOS BY THE AUTHOR

THE LIVES AND LABORS of few insects have so gripped man's interest and imagination as those of the common honey bee. The incredibly efficient social organization of the hive has been fascinating through the ages. The economic importance of the bee to man—from his earliest primitive days to the atomic present—and to plants has hardly an equal in the insect world.

It is no wonder that any discovery of bees of the distant geological past brings joy to students of insect life. Unfortunately, fossils of quite early bee forms are not common. Only about half a dozen localities for fossil bees are known, most of them in western Europe. The oldest known geological specimens of the honey bee were discovered imprisoned in amber from the East Prussian coast. Such finds are very rare, but at least one was known to the Romans, whose poet Mar-



tial composed a special ode to such an amber bee in which he suggested that she looked as though imprisoned in her own nectar. Surely, he exclaimed, that is precisely the death she would have wished for!

Other bee fossils from the Eocene, Oligocene, and Miocene have been found in western Germany and in the French Provence.

Undoubtedly the most important fossil collection of bees which did their buzzing in the swampy tropical forests of the Oligocene around 35,000,000 years ago comes from a place called Rott, in the Siebengebirge (Seven Mountains) of the West German Rhineland. As early as 1907 two of the fossil bees from Rott, one owned by the Harvard Museum and the other by the British Museum, were described by T. D. A. Cockerell as *Synapis dormitans* and *S. henshawi*, respectively.

But it remained for a German schoolteacher named Georg Statz really to enrich our knowledge of the little honey bee of the past. For more than a quarter century Statz collected tirelessly in the Rott deposits, amassing and classifying an enormous collection of

▲ Part of the Statz Collection at the Los Angeles County Museum, with Dr. Fred Truxal. (P. T. Furst)
◀ Dr. Georg Statz. (Los Angeles County Museum)



← Water spider, *Argyroneta antiqua*.

Length (head and body) 12 mm.
For tens of millions of years this
arachnid has lived in ponds and
sluggish streams of Europe and Asia,
breathing oxygen from a silvery air
bubble she picks up periodically
at the surface. The modern form
is *Argyroneta aquatica*.

→ Honey bee worker, *Synapis dormitans*.

Length (head and body) 14 mm.



A tiny plant, greatly enlarged.



fossil insects including many honey bees, from those Oligocene forests of the Rhineland.

In 1945, at the age of 51, Statz died in Germany while trying to get back to his beloved collection which fortunately had survived the war. It had been housed in the cellars of German scientific institutions while his own home was destroyed by bombs. It is a measure of Georg Statz's love for his life's work that almost his last words to his wife as he lay dying at Ulm on the Danube were, "What about the collection? Is it safe?" And he died knowing it was, indeed, safe.

Today the Statz Collection of Fossil Insects and Plants—7,500 specimens including land and water in-

sects, spiders and tiny plants, all beautifully mounted and fully classified and described, along with many photographs and monographs—is housed permanently at the Los Angeles County Museum. It was acquired after many months of negotiation with the late naturalist's family and the French customs authorities in North Africa where the collection had been sent after the end of the war.

The Statz Collection was built between two wars, for it was in 1918 that young Georg—born in 1894, a teacher's son and an inveterate collector of anything from butterflies, fossils, and flowers to ancient Roman and Greek relics—discovered his first fossilized insect at Rott. A teacher himself, he was drawn as if by a



magnet, vacation after vacation, his wife and daughter with him, back to the Oligocene forests of Rott, from which he shipped hundreds of rock slabs back home to Cologne by truck. After school hours he laid the slabs carefully out in his garden to let the winter frost split them. Then cutting the slabs down to handy size, he meticulously photographed each specimen and classified it. The final step was mounting in special wooden display cases he designed.

No difficulties fazed Georg Statz. Realizing a lack of proper academic background for his work at Rott, he went back to school, studying from 1925 to 1930 at the University of Cologne which, in 1940 recognized his great contribution to science by awarding him an honorary doctorate. With bombs falling and



Hind or middle leg of a scarabaeid beetle.
Length ("knee" to claw) 11 mm.

◀ Ladybird beetle, *Coccinella* sp.
Width (wing-tip to wing-tip) 12 mm.

► Immature form of a true bug.
(Actual size not given, but this
is probably enlarged between
six and 10 times.)



the old city crumbling into ruins around him, he continued his scientific work through World War II until, in October 1944, a direct hit destroyed his own house. Reluctantly he left for Bavaria with his wife and daughter, his collection finding refuge in the cellars of the Geological Institute.

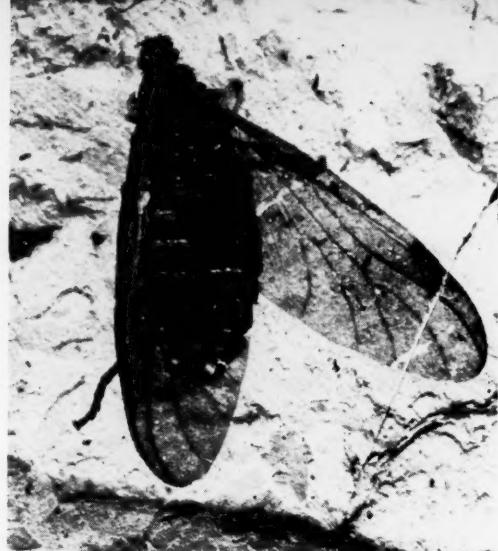
After VE-Day, the Statzes took the road back to Cologne, to rebuild their lives. Weakened by the years of war, however, Dr. Statz fell ill at Ulm on the Danube, in June 1945, and died August 28. In her correspondence with the Los Angeles County Museum, his widow described his great happiness in his last moments on learning that his life's work was intact. "His collection, after all, was his whole life," she wrote.

His life, and now his monument, the collection includes 45 specimens of four kinds of honey bees, besides fruit flies, true bugs, many of them aquatic, and many plants. Among the most remarkable of the fossils are those of the very perishable water spiders, *Argyroneta antiqua*, forebears of the modern European and Asiatic *A. aquatica* which, encased in a silvery bubble of air picked up periodically at the surface, lives in ponds and quiet streams feeding on tiny aquatic insects and small fishes.

The gathering, preparing, classifying and interpreting of all these thousands of specimens, representing a past remote by tens of millions of years yet directly tied to the present, was the work of a devoted man with the kind of tireless, inquiring mind which brings

Marsh fly,
Plecia rhenana.
Length (head to
wing-tip) 19 mm.

The actual
insect is to
the left;
to the right is
a natural cast
or negative
impression.



progress in science and society. But to recreate the life of the past and relate it to that of the present takes more than hard work and pure science. It takes imagination. As Dr. Fred Truxal, Los Angeles County Museum curator of entomology and now guardian of the Statz Collection, put it: "You could look at all those beautiful specimens, meticulously classified and described, and think, 'What a cold, scientific mind it must have taken to do all this painstaking work.' Nothing could be farther from the truth. To me, Statz was a poet."

Just how much of a poet is shown in every line of the Statz monographs. No matter how detailed and accurate his scientific descriptions, he always found

time to speculate on the lives of his ancient insects—the bees, buzzing from flower to flower in the Oligocene forests, without man there to take the fruits of their labor. To him, his specimens were no mere dead, cold fossils. They were, as he wrote in closing his monograph on the 35,000,000-year-old bees of the Rhineland lignite forest, almost alive:

"Even if during the lifetime of these children of the sun no man's eye or ear could feast itself on their busy labors, it is as though the beholder of their fossilized remains even today perceives, ever so gently as from a great distance, the humming of the bees, the rustling of the leaves, and the scent of the flowers of the lignite forests. . . ."



◀ A small fly, *Empis spinifera*, closely related to our common house fly, shows even the minute leg hairs and delicate structure of wings. Length (head and body) 7 mm.

► A water bug (a true bug), *Naucoris rottensis*, immature. Length (head and body) 9 mm.



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ue bug),
mature.
9 mm.



The desert horned lizard (Phrynosoma platyrhinos platyrhinos) withering heat, and often year-long drought of the extreme deserts.

THE EXTREME DESERTS



Furnace-like wastes of the extreme deserts are nowhere better typified than in Soda Dry Lake, the Mojave's deadly Sink. In this enormous alkaline playa, exhausted waters of the fading desert stream commonly vanish; while sunbaked earth and heat-tortured rocks that rise from the fossil lake's abandoned shores dramatically picture a "mummified" landscape.

► *In our Southwest, the horned rattlesnake or sidewinder (Crotalus cerastes) is the originator of that singular looping gait that gives traction with minimum contact over loose, shifting, and hot sand.*

(Photographs by the author)

rhinos platyrhinos) is admirably suited to the intense light, of the extreme deserts, like rocks, stunted shrub cover.

EXTREME DESERTS



JOHN L. BLACKFORD

WHEN trail-blazers and pioneers approached the lower Colorado River from the east, the barrenness of the great American desert struck them with mounting force. Once past the river's narrow borders of green, they soon realized the most perilous part of the westward journey was facing them. They had reached the extreme deserts.

A climax of all the forbidding forces of heat, thirst, desolation, and drought is reached in southeastern California. We call these sun-stricken regions the Colorado and Mojave deserts. In their superheated basins and sinks—in Soda Dry Lake, Death Valley, the Panamint—the arid lands achieve their waterless ultimate.

Yet strangely, even across the malpais, the black lava scab lands, and down in the treacherous below-sea-level salinas, life has stayed to conquer the wastes. Many of the Southwest's most fascinating plant and animal forms know no other home than the extreme deserts.

¶ The desert swift or kit fox (Vulpes macrotis) hunts wary kangaroo rats, pocket mice, antelope ground squirrels so skilfully that he can subsist in limited numbers even on shifting, shrub-dotted dunes and in barren basins.



VICTORIA WEST

London Bridge, southwest coast of Victoria.

Patricia Bailey Witherspoon

FROM MELBOURNE we drove 80 miles through sheep and cattle country to Ballarat, Victoria's second largest city, with a population of over 50,000. Ballarat (an aboriginal word meaning "resting place") is an old mining community with a "glory hole" where thousands of pounds of gold were extracted in the old days. The magic word of gold, back in 1851, brought adventurers from all parts of the world, increasing the population of the nation manyfold. The "Welcome Stranger," largest gold nugget in the world, weighing 150 pounds, was found by a man who was down on his luck and badly in debt. It is easy to

imagine his joy as he literally stumbled over the nugget, worth a fortune to him.

The members of the Ballarat Naturalist Club showed us through their beautiful botanical garden where there were fine examples of the ancient *Araucaria* and Bunya Bunya pines from tropical Queensland and extensive plots of flowering plants. They presented my mother with a box of colorful begonias, commenting that a similar gift had been made to Queen Elizabeth when she visited Ballarat.

The itinerary took us to Bendigo, 90 miles away, another city that had seen stirring times during the

Photos by Alfred M. Bailey

gold rush. Our naturalist friends not only showed us interesting back country where characteristic birds and bounding wallabies were numerous, but they also arranged a visit to the famous old central Deborah Mine—an exciting experience for me. Mr. Chambers, mining engineer, secured slickers for us to wear and with little carbide lights we were lowered down to the 1,200-foot level. From there we followed along 900 feet of narrow tunnel and saw various foldings of the gold-bearing rocks. On our return Superintendent Rowe pleasantly surprised me with a large sample of gold ore.

Our next journey from Melbourne assumed the proportions of a safari with Dr. and Mrs. Pescott and staff members of the Museum taking us by station wagon and Australian-made Holden car to Portland in the southwestern corner of Victoria. It was a cold and stormy day, typical at that time of the year. But when we reached the large city of Geelong a lightening sky and a glimpse of the sun encouraged us to take the longer scenic ocean route, a curving, twisting drive that followed along high cliffs overlooking the sea and then wound abruptly down to the azure blue waters where the breakers were rolling white.

We lunched on tea and sandwiches in the car for it had started to rain again. Then at Otway Peninsula the highway cut inland, twisting up and down, and making sharp turns. The road skirted gullies grown with bracken and led through lush green valleys grazed by cattle and sheep. Rugged hills were forested with giant blue gums, and twenty-foot tree ferns so dense that sunlight barely filtered through.

It was growing late as the narrow, slippery, and

muddy road led back to the coast where onshore winds hurled breakers against cliffs two hundred feet high. A path led through tussock grass to a little cemetery where white grave markers recorded one of the tragic events of historic interest. Nearby was a cove named Loch Ard for the clipper *Loch Ard* piloted by Captain Gibbs, Master, which crashed on Mutton Bird Island on the night of June 1, 1878. All hands were lost except a young girl, Eva Carmichael, and the cabin boy, Tom Pearce, who were washed through the mouth of the gorge, clinging to debris. Miraculously they landed on a ledge and Tom Pearce made his way up the cliffs to secure help. All the members of Eva's family perished, and the memorial tablets in the shrine of the gorge were erected some years after in their memory. Eleven other ships have crashed along that particular bit of wave-beaten coast.

At sundown we reached the picturesque fishing village of Port Campbell intending to push on to Warrnambool. All progress stopped suddenly, however, when the front spring of the station wagon broke—only two hundred yards from the hotel and one hundred yards from a good mechanic. Had the break occurred any time during the afternoon, we would have been stranded indefinitely, far from help.

Ocean House, the only hotel of the community, had recently closed for the season but the kind family who lived there the year round let us stay for the night as well as share with them their steak and egg dinner. Afterwards we tried to escape the penetrating chill by crowding around a tiny fireplace in the lounge only to get miserably cold all over again when making a hurried visit to the outside washroom. The hardy

Part II of "KOALAS, KOOKABURRAS, AND KANGAROOS"



Erosion reveals layers of volcanic ash near the town of Warrnambool, Victoria.



Crayfish catch at Port Fairy.

from below causing explosions which formed large craters. At Town Hill just outside Warrnambool we saw the largest caldera, the eruption, according to geologists, having occurred possibly as recently as 2,000 years ago. Successive layers of ash, which had been deposited after volcanic activity, looked to me more like sedimentary rocks than cliffs resulting from the actions of volcanoes.

Beyond Warrnambool, a popular seaport town during the hot summer months, was Port Fairy on the shores of the River Moyne. Captain James Wishart named the port after his cutter *Fairy* in 1810; he was followed by Captain John Mills in 1826 and soon hardy whalers established a permanent settlement. One of the well known pioneers was John Griffith who built a try-works and a rendering-down station for the whalers—an unsuccessful endeavor, for the industry did not thrive.

Stormy weather prevailed during our short stay at Port Fairy. The dock of the River Moyne was lined with fishing craft, some piled high with traps used for catching crayfish. We took motion pictures of fishermen as they hoisted their catch from the hold and transferred the active crustaceans to a live box. The tails of these large clawless lobsters are in such demand that the local people can no longer afford to eat them. In the last five years the crays have increased more than five times in price and are now considered an item of luxury for the villagers rather than a regular part of their usual diet.

We pushed on to Portland, the southwestern seaport village of Victoria. It is nicely situated on a deep harbor which was being improved so that ocean-going vessels could be accommodated. In the afternoon we took both cars and drove down the bush road, where a bounding wallaby tried to outrun us as we headed toward Cape Nelson.

A lighthouse dominated the 300-foot basaltic cliffs, with white-topped waves crashing far below, the spray being carried upward and over the light purple blossoms of the mesembryanthemum that masses on the slopes. Why Australians call this beautiful native flower "pigsface" is more than I can understand. The hardy plants grow in poor soil across much of the desert country; they remain dormant for months, but when rains come a miracle seems to happen almost overnight, as the waste lands come into bloom.

We were given wonderful hospitality at Portland by naturalists of the region (N. J. Learmonth, ornithologist, and Mr. Lighbody, botanist, and their families, and Clifton Beaglehole, a dairy farmer and authority on Australian orchids). They took us to the Blow Holes to see spectacular waves come crashing upon the volcanic cliffs; we watched the waves building up and then as they shot through the crevices, we had to run fast or be drenched by the heavy spray. We were shown wonderful shores, the finest being

Australians are undaunted by their sometimes rigorous weather and consider a house stuffy if doors and windows are closed. Almost every night dressed in warm long underwear and a heavy sweater, I toted my hot water bottle to bed—indeed, a "hottie" is standard equipment in almost all country hotels.

While repairs were being made the following morning there was time to admire the beauty of the surroundings. Lines of white-topped waves raced across the entrance of the harbor and a stiff offshore wind hurled the spume backwards while silver gulls rode the updrafts along the cliffs. While we wandered, taking pictures, a milkman with a two-wheeled cart drove down the main street, and a rosy-cheeked lass clutching a black puppy in her arms watched open-eyed as he ladled milk into containers provided by his customers.

Nearby was a quiet lagoon where spur-winged plovers were running along the shore and a flock of black swans rose into the air when we attempted to photograph them.

With repairs completed we were on our way, pausing along the coast line briefly to take a few shots of one of the most spectacular of all Australian cliffs—London Bridge—where the waves of the Southern Ocean had cut great arches. The crashing surf piled high as it approached the shore, and from our vantage point it seemed that every white-topped surge would dash Bob Boswell off the windswept top of the arch.

As we skirted the coast west of Warrnambool, it was hard to realize we were passing through the western end of the third largest lava field in the world. The plain extending from Melbourne southwest to Portland consists of nine thousand square miles of lava. A short time ago, geologically speaking, a hundred or more volcanoes were pouring molten rock over the landscape. Many threw fine ash for miles and others were like bombs, the pent up pressure of steam



▲ The landing at Lawrence Rock.
▼ Gannet colony on the level top
of sheer-sided Lawrence Rock.



Shelly Beach where miles of pure gleaming sand met the ever-rolling waves.

Along the picturesque Glenelg River, which rises in South Australia and flows across a corner of Victoria,



▲ Emu in
the forest.

► McKenzie Falls
in the Grampian
Mountains.

Mr. Lighbody had a botanical study area where my father and I were privileged to plant a tree. We "boiled the billy" along wooded lakes and photographed a yellow robin upon its nest and saw pelicans, swans, ducks, fleet-footed emus, and cousins of the kangaroos, the wallabies as they bounded along. In the thick stands of slender tea trees, laden with white blossoms, were numerous small covered-over nests; and when we struck one of the tree trunks a sharp blow, a ring-tailed possum stuck out an inquisitive nose to see what had caused the commotion.

Five miles offshore from Portland is precipitous Lawrence Rock where one of the few colonies of Australian gannets successfully rear young each season. I have spent considerable time with gannets on our own Bonaventure Island off the coast of the Gaspé Peninsula in Quebec and was anxious to become acquainted with the Australian form.

It was a gray day that we set out in a good seaworthy craft, but as we came into the lea of the island, Dad gave one look at the waves piling high and informed me that I was not going ashore.

There was a sheer rock with a ridge connecting a smaller one. The wind was out of the southwest and when the waves struck the low ledge, the waters raced across six feet in depth. It was the only place to land. My father went ashore first with his cameras to film the others. The skilled boatman waited for a lull, backed in between waves, and Dad scrambled ashore, hastily reaching high ground, the other men following closely.

On top of the island was a small colony of gannets differing from our North American species in having a black band across the tip of the secondaries, while ours are immaculately white. The nesting birds had eggs,



► Od man gray in the gum forest.

small and large young, but I had to be satisfied with close-up views as the old ones cruised close to our craft.

The boatman was greatly perturbed as the men stayed on the rock. The waves were increasing in size and he kept muttering "I'll never get them off." He did, but only after well known ornithologist Warren Hitchcock and Game Department Photographer Derrick Falconer were swept from their feet and two Leica cameras were ruined by salt water.

We drove northward through stands of low eucalypts, the ground ablaze with red



Gray kangaroo
mother, her joey's
feet hanging out
of her pouch.



Blue-tongued lizard.

heath. There were many grass trees, primitive plants of the lily family, with tall flowering spikes reminding me of the sotol of our Southwest arid regions. They grow very slowly, are highly inflammable, and the resin from the trunks was used by the aborigines to fasten spearheads to shafts. Mr. Brazenor demonstrated how combustible the plants were by applying a match to an isolated one, where there was no danger of the fire spreading. As soon as the flame touched a green frond, the tree literally exploded.

North of Portland was an extensive area of low rainfall known locally as the Little Desert. Unusual amounts of moisture had fallen in the past few weeks and the arid desert region was a mosaic of colorful plants. Most conspicuous were the white blossoms of the tea tree named by Captain James Cook who used the leaves to make a brew to cure his men of scurvy. Rose-breasted cockatoos were in the heavy cover of the mallee eucalypts, stunted trees with many slender trunks coming from a heavy root.

At the pub, the little hotel of the small community of Kiata, the people told us that a project was underway to turn their desert region into good agricultural ground by the use of chemicals.

We headed on northward taking a twisting road through the rugged Grampian Mountains, which during the summer heat are a haven for holiday seekers. They come from hundreds of miles away to enjoy mountain flowers, to climb steep rock faces, and to see the lovely McKenzie Falls.

Dropping down a precipitous escarpment, our journey continued through low country which had been cleared of the towering gum trees for pasture lands.

The paddocks were dotted with thousands of sheep and we passed flocks being moved from one station to another.

A chilling rain began to fall so we were glad for shelter at Warracknabeal. We were the only lodgers and in the large lounge we hung close to the fireplace putting off for as long as possible going to our bleak bedrooms.

In spite of the rains we had encountered, the northwest corner of Victoria is in the semi-dry belt where moisture is not sufficient for growing crops without irrigation. The soil is red, and the next day our journey was through forests of mallee eucalypts with open glades dotted with everlasting daisies—flowers with scant leaves enabling the plants to withstand long periods of drouth.

The majority of Australia's reptiles are nocturnal and seldom seen. I did not encounter any venomous snakes—except those in captivity—but we did see many lizards, all of which are harmless.

The strange stub-tailed lizards—ferocious looking scaled fellows a foot in length—belied their appearance, for they were inoffensive, merely backing off with hissing notes and a show of blue tongues. Their stubby tails were nearly as large as their heads, so like modern motor cars it was hard to tell which way

they were pointing. We saw frilled lizards and the bearded dragons all looking like miniature monsters of ages past; while the largest encountered was a goanna, a fast moving creature when alarmed.

There were numerous small species of birds; the little pardalote nested in holes, and gray flycatchers fastened themselves to dead branches, where homes and birds were the same color as the bark of the mallee eucalypts. The adult flycatchers were fearless and returned to brood or feed their young, even though we were standing within a few feet.

(To be concluded)

Monitor lizard.

Stub-tailed lizard.



THE EDITORS of *Pacific Discovery* very kindly allowed your columnist to indulge one of his "pet peeves" in his first appearance on these pages. This writer has long objected very strongly to the e. e. cummings or don marquis trend in the use of common names for our plants and animals. If it is agreed that the primary purpose of such names is to enable people to communicate with each other intelligently about the various plant and animal species, then I for one fail to see how the elimination of capitals can do anything but interfere with the fulfillment of this objective.

Some scientists condescendingly take the attitude that what is done with common names matters not the slightest because only the scientific names are used by those of importance—themselves. This is not only arrogant but patently unfair to the many teachers, camp counselors, park naturalists, nature hobbyists, and others who do use the common names. Also, in some cases, many scientists find the common names quite useful.

If the common name is capitalized there can be no doubt in anyone's mind as to which descriptive words are part of the name and which are not. When lower case is used, frequently there is no possible way of telling which words make up the name and which are descriptive perhaps only of certain specimens rather than the species in general.

For example a little house fly to virtually all general readers and to most biologists, indeed to most entomologists other than those concerned with flies, could only be a small specimen of *Musca domestica*. But, it isn't. It is the common name approved by the Entomological Society of America for *Fannia canicularis*. If it were written Little House Fly, it would no longer be subject to the same confusion with the House Fly. Actually this particular name is so confusing that a number of agencies reject little house fly in favor of the older lesser house fly—which still seems somewhat confusing without the capitals.

Insect names may be particularly easy to misinterpret for two reasons. There are so many insects that their names may be unfamiliar to the reader and also they often include two or three modifiers instead of only one. Nearly all of the names based on size or color are especially subject to misinterpretation. To mention but a few

taken from the approved list (Common Names of Insects Approved by the Entomological Society of America)—"black elm bark weevil," "green meadow locust," "yellow rose aphid," "little black ant," and "large canna leaf roller." Also confusing are the "common malaria mosquito," the "devastating grasshopper," and the "native holly leaf miner." Almost any sentence written about these insects could be misleading if lower case is used.

Examples can be taken from other groups as well. Among the amphibians and reptiles we have the "common American toad," the "dwarf American toad," the "western bird-voiced treefrog," the "common snapping turtle," and the "western slender glass lizard." In some cases even the simplest of names can be all too confusing in lower case. For instance—"red bat," "yellow bat," "hoary bat," and "big brown bat."

Let us not overlook the plant world which gives us "dwarf goldenbush," "spiny greasebush," "sticky flowering currant," and "small white Nemophila."

Faced with this problem in editing the UC Press Natural History Guide Series, it was decided that in order to better inform and not mislead our readers, common names would be capitalized. In order to do this systematically the following rule was established in the introductory volume:*

"In the California Natural History Guides, common names for species will be capitalized, but general names that refer to groups of species or one or more genera will not be capitalized. Thus, sparrow, is not capitalized, but Golden-crowned Sparrow is."

In talking to Roger Tory Peterson at the Audubon Convention in Asilomar earlier this year I learned that he has followed essentially the same rule for the same reasons in the Houghton Mifflin Peterson Field Guide Series.

Nevertheless the great majority of publications today—periodicals and books—use lower case for common names. If any of the readers of *Pacific Discovery* feel strongly that the current practice of using lower case common names should be accepted and is justified I would be happy to hear your views and to share them with other readers in a future issue.

* *Introduction to the Natural History of the San Francisco Bay Region*. By Arthur C. Smith. University of California Press, Berkeley. 1959.

WATCH FOR

DURING MOST OF THE YEAR, usually March through October, these salamanders are in hiding deep in animal burrows, other holes in the ground, or in rotting logs. In central California, after the first heavy soaking rains in the fall, usually in November, they again come to life.

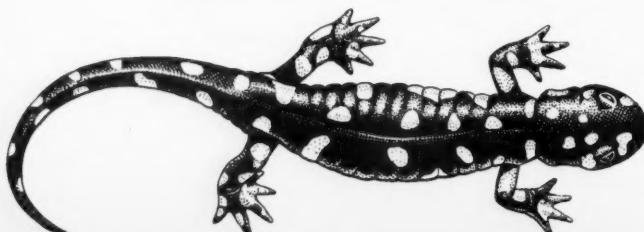
Perhaps the easiest way to find Tiger Salamanders at this time of year is to go out at night after a rainstorm to a country road or highway which passes near a pond, lake, reservoir, or slowly moving stream. Under such circumstances this species may be found migrating, sometimes in large numbers, from summer burrows to the aquatic

habitats where breeding takes place. This migration takes place in early spring or late winter in the northern and eastern states. With a flashlight, spotlight, or a gas lantern the salamanders may be sighted as they cross the road. They also may be collected from the water with a seine or dip net but this is more difficult.

After mating, eggs are deposited singly or in groups on twigs or weed stems in shallow water. Aquatic gilled larvae hatch from the eggs in from two to three weeks. These larvae usually develop for from two to four months before transformation to the adult form takes place with shrinking and absorption of the gills, development of lungs, and a change in body contour.

An interesting variation in the life cycle is found in

Tiger Salamander (*Ambystoma tigrinum*). (Drawing by Robert C. Stebbins, from his book *Amphibians and Reptiles of Western North America* [1954], courtesy of The McGraw-Hill Book Company, Inc., New York, publishers)



What Do
You Know
About
Nature?



INSECTS



(Lester Brubaker, Western Photo and Science Service)

LOOK AT THE PICTURE carefully and then answer the questions by filling in the blanks with a letter to indicate the correct choice to complete the sentence. Then turn to page 30 to see how much you know about these insects.

1. These insects spend a part of their lifetime ____
A in the air. B in the water. C underground. D boring in rotten wood.
2. They are correctly known as ____
A American cockroaches. B kissing bugs. C predaceous diving beetles. D electric light bugs.
3. They belong to the order of ____
A bugs. B cockroaches. C termites. D beetles.
4. These insects feed on ____
A small aquatic plants. B large aquatic plants. C other insects. D small fish and tadpoles.
5. The larva of this insect is known as the ____
A water tiger. B toe biter. C back swimmer. D water boatman.

6. The eggs of this insect are laid ____

A loose in the water. B on top of the water. C in the mud or sand at the bottom of the stream or pond. D in punctures in the tissues of aquatic plants.

7. These insects ____

A do not breathe air. B return to the surface of the water for a fresh supply of air which is stored above the abdomen under the wing covers. C obtain air from the stems of aquatic plants. D take oxygen directly from the water.

8. They may be distinguished from all other groups of insects by their possession of ____

A six legs. B four wings. C compound eyes. D horn-like front wings.

9. Their color may best be described as ____

A black and yellow. B green and pink. C brown and blue. D red and gray.

10. These insects may be found ____

A only in California. B only west of the Rockies. C only in the arid southwest. D throughout the United States.

the Tiger Salamander (*Ambystoma tigrinum*)

this species, particularly from the Rocky Mountain area southward into Mexico. Transformation to the adult may be long delayed, even for many years, or may not take place at all. The technical term for this prolongation of immaturity is *neoteny*. These more or less permanent larvae are known as *axolotls*. The axolotl was considered a distinct species until 1865 when specimens in the Paris Zoological Gardens suddenly transformed into Tiger Salamanders. The axolotl was first found in Mexico and this Aztec name has been retained for the larval form. Such neotenic larvae have been quite common in Lake Texcoco and other parts of the Valley of Mexico and still may be found in the native markets, especially at Xochimilco, where they are sold as food.

Larvae normally transform when they reach from three to five inches in length but axolotls may grow to from seven to ten inches. Adults may range from five to slightly more than 13 inches in length.

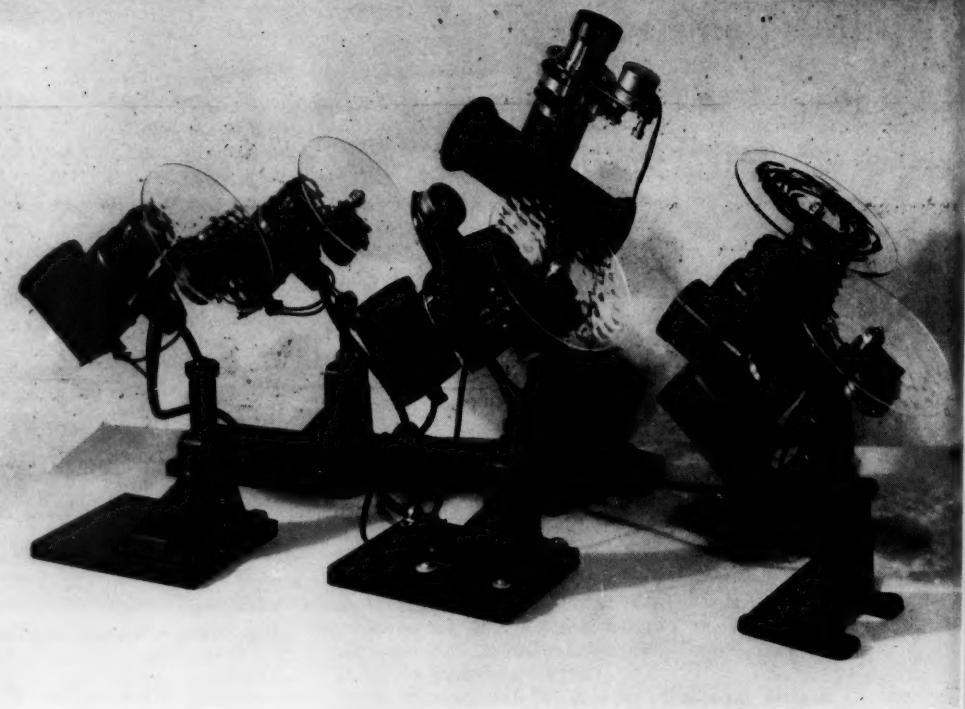
Tiger Salamanders eat earthworms, insects, and other small animals and in captivity may be induced to eat small bits of fresh meat. They may be kept successfully in the home terrarium. In fact, specimens have been maintained in captivity for more than 15 years as adults and 25 years as neotenic larvae. For instructions on setting up the home terrarium and advice on caring for Tiger Salamanders as well as many other wild animals see Clifford B. Moore's *The Book of Wild Pets* (Charles T. Branford Co., Boston).

Conducted by George W. Bunton

Sky Gadgets

MAN-MADE AURORAE—
a few of the special projectors built in the California Academy of Sciences instrument shop for use in the Alexander F. Morrison Planetarium.

These produce several of the different kinds of auroral displays which appear with such vivid and colorful realism in the planetarium sky. More than fifty special devices for illustrating various astronomical phenomena have been created in the Academy shop since 1951.



SKY DIARY

November, December, January 1959-60

(Pacific Standard time throughout)

Phases of the Moon

③ First Quarter	November 7	5:23 A.M.
④ Full Moon	15	1:42 A.M.
⑤ Last Quarter	23	5:03 A.M.
⑥ New Moon	30	12:46 A.M.
⑦ First Quarter	December 6	6:11 P.M.
⑧ Full Moon	14	8:49 P.M.
⑨ Last Quarter	22	7:28 P.M.
⑩ New Moon	29	11:09 A.M.
⑪ First Quarter	January 5	10:53 A.M.
⑫ Full Moon	13	3:51 P.M.
⑬ Last Quarter	21	7:01 A.M.
⑭ New Moon	27	10:16 P.M.

The Planets

Mercury: Is at greatest eastern elongation (farthest east of the sun) on Nov. 3, but it is also farthest south on the same day. This places it in only a fair position to be seen in the evening sky. On December 11 it is at greatest western elongation and is nearly farthest north of the sun as well. This combination of conditions makes it best visible in the morning sky rising one and a half hours before the sun.

Venus: Reaches greatest western elongation on November 11 when it will rise nearly three hours ahead of the sun. It will still be a brilliant morning star at Christmas time. Magnitude of Venus: November 11, -4.0; December 25, -3.7.

Mars: Is poorly situated for observation during the entire period. It rises about an hour and a half ahead of the sun at the end of December, and about two hours ahead at the end of January. It is on the far side of the sun and is very faint.

Jupiter: Moves too close to the sun to be seen by the middle of November. It is in conjunction with the sun on December 5. It will be visible as a morning object by the middle of January, and will be in conjunction with Venus on January 21. The separation

between the two planets on that morning will be twice the diameter of the moon, Venus to the north of Jupiter.

Saturn: Remains in Sagittarius and is in conjunction with the sun on the last day of the year. It will be visible as a morning object by the end of January, but very faint—magnitude +0.8.

Earth: The earth tilts its north pole away from the sun at a maximum angle on December 22 at 6:35 A.M. P.S.T. This is the beginning of winter for the northern hemisphere. The amount of this tilt which is known as the *obliquity of the ecliptic* is $23^{\circ} 26' 30.29''$ on December 22. The earth is nearest the sun on January 4, at a distance of 91,314,000 miles.

Note: Every profession has its peculiar system of notation which is puzzling to those unfamiliar with it. One of these is the magnitude scale used by the astronomer. The system originated with the Greeks before the birth of Christ. Purely arbitrarily, the stars were divided into six categories of brightness. The brightest being called *first magnitude* and the faintest *sixth magnitude*. The stars of intermediate brightness fell into their respective magnitude categories. The system survived through the ages and in modern times has been extended and modified to provide an exact indication of the brightness of objects over the range from the sun to the faintest objects photographable by the largest telescopes.

It was discovered that the average star designated by the early astronomers as first magnitude was almost exactly 100 times brighter than a typical sixth magnitude star. It was decided that this should be the basis for the precision magnitude scale. The difference in magnitude number between first and sixth is five, and since the corresponding difference in brightness is 100 times, the difference in brightness between any two adjacent magnitudes becomes the fifth root of 100 or 2.53. A first magnitude star is 2.53 times as bright as a second magnitude star. A first magnitude star is 6.4 times as bright as a third magnitude star, and so on.

Some stars are obviously brighter than the average first magnitude star of the Greek system, so the magnitude scale had to be extended. A star 2.53 times as bright as first magnitude must be called a zero magnitude, and the next step must be a minus one (-1.0). Sirius, the brightest of the stars, is of magnitude -1.58. Venus reaches a maximum brightness of magnitude -4.3. The full moon is magnitude -13 and the sun -27. The difference in magnitude between the moon and sun is 14, equivalent to a brightness difference of nearly 400,000. G.W.B.

REVIEWS

East of the sea, west of the land

Sea Shells of Tropical West America. By A. Myra Keen. Stanford University Press. 626 pp., 10 colored plates, over 1700 figures in text. \$12.50.

There has long been a need for a comprehensive handbook on the marine shells of the west coast of North America, especially one dealing with the rich, varied, and beautiful fauna in the area extending from the Gulf of California down along the west coast of Mexico to the region of Panama. This is such a book. With it in hand or as a reference the expert malacologist, the amateur conchologist, and even the collector of pretty shells along the beaches may identify specimens with confidence and learn more about them.

It is indeed fortunate that a work of this importance could be prepared by so competent and preëminent an authority as Dr. Myra Keen of the Stanford University Department of Geology. With the view of making her book most useful to the greatest number, she has rephrased the technical descriptions used by the research worker into short, simple terms that can be easily understood. A most valuable part of the book consists of the good black-and-white figures of almost all of the species known or likely to be found, numbered for easy reference to the text descriptions.

For adequate reasons, Dr. Keen has not attempted to cover the myriad of minute marine shells (under 5 millimeters in size) that are included in the fauna of the Panamic Province. While the professional may look upon this as a disadvantage in a handbook, it is without doubt a boon to the amateur as inclusion of them would confuse him and detract from the usefulness of the book.

For the collector of shells in the Gulf of California and south this book is an absolute must. Its format, excellent typography, and illustrations both in color and in black and white, will make a welcome addition to the libraries of all lovers of natural history as well.

A.G.S.

"Journey into wonder"

This World of Living Things. By Paul Griswold Howes. Duell, Sloan and Pearce, New York. 1959. xix + 232 pp., 22 line drawings by the author. \$4.50.

It is a good thing occasionally to sharpen our sense of proportion, our awareness of our relationship to the rest of the world and to the universe. If we did this often enough, we would rid ourselves of arrogance. No one is better qualified to help us true up our proportion scale than a literate naturalist, one who has delved deep in the wonders and mysteries surrounding us and has the gift of words to tell us what he has seen and share with us his thoughts about what he has found. Paul Griswold

FOCUS ON NATURE: Answers to Quiz on page 29—

Allow ten points for each correctly answered question and then consult the scale below to see how you rate.

- 100 You are a top-notch entomologist.
- 80-90 You really know your insects.
- 60-70 You are a fair entomologist.
- 50 Perhaps you'll get a good insect book for Christmas.

below 50 Maybe insects just aren't your cup of tea.

- 1. **A** or **C**. In the air as adults, in the water as larvae and adults and underground as pupae. 2. **C** predaceous diving beetles. 3. **D** beetles. 4. **C** or **D** other insects, small fish and tadpoles. 5. **D** water tiger. 6. **D** in punctures in the tissues of aquatic plants. 7. **B** return to the surface of the water for a fresh supply of air which is stored above the abdomen under the wing covers. 8. **D** horn-like front wings. 9. **A** black and yellow. 10. **B** throughout the United States.

A.C.S.

Howes, the curator of the Bruce Museum of Natural History, History, and Art in Greenwich, Connecticut, is such a man, and he takes us on a "journey into wonder" through *This World of Living Things*. His way of scaling down our pride is to enumerate just a few of the still unsolved mysteries of life and the universe. Our ignorance of fundamentals runs all the way from "how the first living cell was created" to "how the universe was born," and "what energy is." We do not know how we, the people, got from where we started to where we are, wherever that may be. But—and here I think is a key to Howes' approach that he would give us—however far we have reached into stratospheres of the mind, we are still down there with our fellow creatures on earth physically. Contemplate the fact that the human spermatozoon—the incredibly minute single cell which must find and unite with an egg cell to set each and every one of us going—is indistinguishable from that of countless other animals under the lens of a microscope. And the fact that we do not even know the mechanism by which we become men instead of mice, let alone the how and why of our *being* at all. Let us reach for outer space, as we must, being men, but let us, with Howes, remember there are still vast unknown spaces in our comprehension of *this* world of living things.

On getting unlost

Nature Is Your Guide: How to Find Your Way on Land and Sea by Observing Nature. By Harold Gatty. E. P. Dutton & Company, Inc., New York. 287 pp., illus. in color, halftone, and line. \$4.95.

The practical value to man of keeping himself oriented to the world of all other living things may be read in part in this book, as fascinating to read as it is useful, by a famous aviator, the late Harold Gatty. Finding himself in unknown territory—land or water—without recognizable landmarks and communication with other human beings, one's chances of surviving and regaining the familiar human world are in direct proportion to his knowledge of and ability to interpret the observable facts of the world of nature. For the pleasure of knowing and reading this book of the famous Australian who died while it was in press, I am indebted to my friend Harold J. Coolidge who handed me his copy of the Collins (London, Sydney) edition to read on shipboard crossing the Tasman Sea from Australia to New Zealand. My experience gave particular meaning to such chapters as "Directions from Waves and Swells," "Colour of the Sea," and "The Habits of Sea Birds." In his lifetime Harold Gatty became recognized as the world's greatest authority on navigation, won our own D.F.C. for his flight around the world with Wiley Post in 1931, and in the same year was put in charge of Air Navigation Research and Training for the U. S. Army Air Corps. Yet with all his mastery of technical knowledge and devices, Gatty remained a superb naturalist in his close touch with the world and the ways of simpler living creatures, his understanding of winds and clouds and seadrift—and he kept in tune with the stars.

Lands of the long night

From the Ends of the Earth: An Anthology of Polar Writings. Found by Augustine Courtauld. Oxford University Press, London, New York. 1958. xvi + 423 pp., enpaper maps. \$4.75.

One who has wintered "alone on the Greenland ice-cap, snowed under for five months by blizzards, buried in almost total darkness, his escape tunnel blocked for the last six weeks before the rescue-party reached him," has

assuredly given more deep thought than most men to the nature of the polar regions. It is not surprising that such a man—a Richard E. Byrd, or an Augustine Courtauld—would have read virtually everything in print relating to those farthest ends of the earth, and would have found in other men's accounts of polar conjecture or experience the most central core of their richness, the parts striking deepest for him, and through him for some of the rest of us. Thus, an anthology. Courtauld's winnowing has given us no less than a résumé of all conjecture and experience which have passed into the record of our dealings with those ultimate parts, since Homer, where "no flashing Sun-God shines down a living night, not in the morning when he climbs through the starry sky, nor yet at day's end when he rolls down from heaven behind the land"; through Viking times, and centuries of blind search for a Northwestern way to the East; and down to fillings-in of the hard-won map. A more sensitive polar anthology is hard to imagine.

From an exotic zoologist

Exotic Zoology. By Willy Ley. The Viking Press, New York. 1959. xii + 468 pp., drawings by Olga Ley. \$4.95.

Mr. Willy Ley is a man with two heads—how else could he be an acknowledged and widely read expert on *Rockets, Missiles, and Space Travel*, and at the same time a "romantic naturalist" with zest for such curiosa as *Dragons in Amber* and *The Lungfish, the Dodo, and the Unicorn*? An obvious advantage of course is a two-headed following. It is good, from my viewpoint, that the prophet of space doesn't take it all, that the two zoological items (1951, and 1941, rev. 1948, respectively) and their trilogy sidekick, *Salamanders and Other Wonders* (1955) are still very much being read. The proof of this is noted in Willy Ley's explanatory foreword to *Exotic Zoology*: "Now it so happened that all three books fell due for reprinting at about the same time [and] each one was due for some revisions; a lot can be (and has been) learned in a number of years. Also there were new things to be added. Doing all this—new themes, additions, revisions, and eliminations—in one full sweep, resulted in this book."

It is not my part here to analyze out the selection. Apart from the appearance of another Ley natural history book as being good news, the thing I'm pointing to here is the chapter called "The Tortoise Islands" which pauses briefly on those of the Indian Ocean but dwells at some length on the Galápagos, their discoverers and visitors, and their namesake inhabitants, the giant tortoises, bringing in Charles Darwin and also the 1905-6 expedition of the California Academy of Sciences.

Gift packages

The Praeger Picture Encyclopedia of Art: a comprehensive survey of painting, sculpture, architecture and crafts, their methods, styles and technical terms, from the earliest times to the present day. Frederick A. Praeger, publishers, New York. 1958. 584 pp., 192 full-color plates, 416 monochrome illus. \$17.50.

A good deal has been said, in this magazine, about art as a characteristic and distinctive activity of man, as a salient part of his natural history. It is not only the faculties of brain and hand, but the esthetic attitude—the need to produce objects having something more than utilitarian value—that have characterized man since the day of the first nicely finished hand ax or symmetrical arrow point. The present large, exceedingly well produced volume selectively illustrates and describes every phase of human culture recognizable as visual art in lasting form (litera-

ture, drama, dance, and music not included). The main divisions are: Art—its Nature, Forms and History; The Art of Antiquity; Medieval Art; Renaissance and Mannerism; Baroque and Rococo; From Neo-Classicism to the Impressionists; Art in the Modern Age; Art Outside Europe. The latter section includes Islam, India, the Far East, Ancient America, and Primitive Art. It is no grounds for criticism of the book (which originally appeared in a German edition) that ancient and non-European art yields heavily in space to the mainstreams of the European or Western tradition. No one volume can give due proportionate respect to all. The part that is weighted here is satisfactorily comprehensive; and the total production adds up to one of the finest big gift books of the year for anyone interested in the culture of man.

Among the large and showy books people like to give each other at Christmas time, a conspicuous nature item is **The World of Insects**, by Paul Pesson (translated by R. B. Freeman, McGraw-Hill Book Company, Inc., New York. 1959. 204 pp., 50 full-color and more than 150 halftone photographs, decorative endpapers, \$15.00). The gorgeous color plates are enough to sell this book to people with no previous attraction towards insects, and the halftones display fascinating variety. This is fortunate, because the appearance of the text is rather discouraging: it is set in long lines closely spaced, some of the type very small. It looks like dull and tedious reading for the layman; and indeed one suspects that neither in the French original nor in the translation was any kind of popularizing job intended. However, the fact that the author is "a distinguished entomologist of the Institut National Agronomique in Paris" should guarantee authoritativeness of the text—all 35,000 words of it.

San Francisco is very much up in the gift market this year. There is that handsome display of fine photography, **San Francisco: a Profile with Pictures**, by Barnaby Conrad (A Studio Book: The Viking Press, New York. 1959. 228 pp., 200 photos, 4 in full color, \$8.50). The lively text and captions provided by the bullfighting Conrad show him to be a true *aficionado* of his native city. Thumbing through for pictures, one unconsciously accepts the invitation to stop and read. There is a nice balance of old and new, of nostalgia and pride-in-the-present, of common-folksiness and the snob appeal of cafe and society gossip-column names, of the broad flourish and the fine-edged detail. . . . As if to enlarge and focus the view through one historic window, there is **The Earth Shook, the Sky Burned**, by William Bronson (Doubleday & Company, Inc., Garden City, New York. 1959. 192 pp., over 400 photographs, endpaper map, \$5.95), a youthful journalist's incomparably fine job of reporting, in words and pictures, the greatest event in the life of the city, the earthquake and fire of 1906. Bronson begins with a spot-check look at San Francisco, where she stood, on 17 April 1906—the day, the night, then the fatal dawn of the 18th (the build-up method, used with equal skill, of George R. Stewart in *Fire and Storm*). The same spotlighting and pinpointing of events in time and place takes one breathlessly yet with clear sight through the days of burning and demolition and rescue and evacuation, to the aftermath of evaluation—with an accounting of other places hit beyond the city—and reconstruction. Many of the photographs, we're told, were never published before.

Enlarging the view in the opposite direction, we are afforded **A Pictorial History of California**, by Bill Murphy (Fearon Publishers, San Francisco. 1958. viii + 204 pp., profusely illustrated, \$7.50), which takes in the whole panorama from Cortés and Ulloa to the drafting of Jimmy



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The Wright Approach to Natural History



First third
Bird,
Two third
Furred—
Platypus.

The PD mail bag recently brought a packet from one P. F. Wright of Victoria, British Columbia, containing several delicate drawings with accompanying terse text. Enquiry elicited the more complete name of the artist-author—Miss Pat F. Wright. We are pleased to present the first of Miss Wright's contributions to a more succinct natural history guide. We may have to keep her supplied with ink, but not with animals.—ED.

Stewart (no-comment department: the book closing with a "historic" Hollywood publicity shot). It is a very fine collection of pictures, and the text breezes along in journalese from vignette to vignette, often with what Herb Caen calls "a touch of wry." I like wry....

A quite different kind of job has been done with *The Islands and Ports of California: A Guide to Coastal California*, by Duncan Gleason (The Devin-Adair Company, New York. 1958. xvi + 201 pp., 70 paintings and drawings by the author, \$8.50). A salt-water man himself, and competent writer and illustrator besides, Mr. Gleason has breathed his own love of the sea into this history of 'longshore and offshore California, and made a very attractive book of it, indeed.

Again reaching for the wider view, we may take in *The Great American West: a Pictorial History from Coronado to the Last Frontier*, by James D. Horan, which Crown Publishers, Inc., New York, are bringing out 3 December 1959 (288 pp., "650 illustrations, including many in color and 500 photographs, many of which were never published before," \$10.00). Horan's handsome big book is the result of ten years' search for material, with emphasis on documentary photographs—a search in which he was fabulously successful in turning up the Pitman collection of 598 glass plates plus albums of mounted photo-

graphs of the West of nearly a century ago. This will be a prime source book for many years to come, with new pictorial material supported by authoritative text, and all very nicely produced.

For the speleophile

A challenging combination of sport and science spiced with danger, spelunking, like skin diving, has lately generated a stream of books ranging from "how-to" manuals to popular historical treatises. We've noted such items as *The Earth Science Institute's Special Publication No. 1: The Cave Book*, by Charles E. Hendrie (The Earth Science Publishing Company, Revere, Mass. 1950. 68 pp., 34 figs., paper, \$1.00)—technical, for serious spelunkers; the book combining history and underground adventure, *Celebrated American Caves*, edited by Charles E. Mohr and Howard N. Sloane (Rutgers University Press, New Brunswick, N.J. 1955. xii + 339 pp., illus., \$5.00); and *Caves of Adventure*, by Haroun Tazieff (Harper & Brothers, New York. 1953. 222 pp., illus., \$3.00), the story of the discovery and first exploration of Pierre Saint-Martin in the Pyrenees, where the young speleologist Marcel Loubens died a quarter-mile underground, his back broken.

Another round of cave books has brought *The Descent of Pierre Saint-Martin*, by Norbert Casteret (translated by John Warrington, The Philosophical Library, Inc., New York. 1956. xi + 160 pp., illus., \$4.75), in which France's foremost leader of underground exploration gives the thrilling sequel to Tazieff's story—the further penetration of the awesome cavern, and the heroic recovery of Loubens' body, as well as a part called "Secrets of the Underworld," which tells of other caves, prehistoric art, and bats.

Another book sponsored, like the Mohr and Sloane compilation, by The National Speleological Society, is *Exploring American Caves: Their History, Geology, Lore and Location: A Spelunker's Guide*, by Franklin Folsom (Crown Publishers, Inc., New York. 1956. x + 280 pp., illus., \$5.00); happily, one supplements the other—Folsom's is in fact the more basic and general.

A young lady who became a spelunker by marrying one has written for the 12-16 age group. Full of information and anecdote, the book is *Exploring Caves*, by Polly Longworth (Thomas Y. Crowell Company, New York. 1959. 175 pp., illus., \$2.75).

Finally, our cave list brings the work of a PD author (see "Clinton's Remarkable Cave," March-April 1956, pp. 26-29)—*Adventure Is Underground: The Story of the Great Caves of the West and the Men Who Explore Them*, by William R. Halliday, M.D. (Harper & Brothers, New York. 1959. xviii + 206 pp., illus., \$4.50). A young Seattle surgeon, Dr. Halliday is Director of the Western Speleological Survey. His book is a must for anyone specially interested in Western caving. The bulk of it is narratives of cave exploration, and there are some engrossing true yarns indeed. Maps in the appended list of Western commercial caves reveal the fact that limestone solution caverns occur chiefly in the Sierra Nevada and other mountain ranges of the West, Southwest, and Rocky Mountain regions, except in the Cascades, eastern Oregon and Washington, and Idaho; lava tube caves are heavily concentrated in northeastern California, in the Cascades of central Oregon and southern Washington, in southern Idaho, and a few in Utah, Arizona, and New Mexico. Caves are ingredients of the landscapes above them; biology, archeology, history, adventure, discovery are all ingredients of caving, as Bill Halliday and our other authors show in their infectiously enthusiastic writings about this new sporting science.

D.G.K.

FROM THE READER

ESP or not to be

The editorial, New Mythology in an Age of Science (July-August 1959), swelled the Academy mail bag slightly for a few weeks. All letters were addressed to R.C.M., who has selected a balanced (?) sample:

You may deal with an ornith-
Or fuss with an ich-
With never a hint of apology;
But man! you're in trouble,
Man! you are sick,
To meddle with parapsych-ology!

UNSIGNED

Referring to the editorial in the July-August issue, I fail to see what Parapsychology has to do with the purpose of the California Academy of Sciences. Therefore I shall not continue my donation but send it to some other organization that does adhere to its purpose. L. A. HOPKINS
San Francisco.

I have just read *PD* and am sending my condolences . . . the bull in the china closet has nothing on you . . . Boy! When you strike a match you use the whole box.

I must say you are a brave man to have such self-assurance, but frankly I think you missed the boat. Some day we must discuss this thing, and I will toss you a few curves, as I would like to see how you bat them.

Klamath Falls, Oregon. KEN MCLEOD

Your discussion of ESP seemed to indicate a completely unscientific approach to the matter. On the rather scant information you present one is surprised that you have such dogmatic views. It may be that you have done more research on the matter than you indicate. In any event you

failed to mention the acknowledged leader in the field—the American Society for Psychical Research. . . .

Careful researchers in this field or any other field are not given to making positive statements proving or disproving any unexplained phenomena. That unexplained phenomena do exist is generally acknowledged.

EDGAR STONE
San Francisco.

Thank you for printing a needed truth. Your article should be given to the *Atlantic* for wider audience—maybe even to *Harpers*, whose second piece on pseudoscience nearly made me stop subscribing. . . .

Even the theory of probability isn't enough . . . if you haven't it, the eminent mathematician Maurice Boll, on "La Chance et les Jeux de Hasard," is tops on the subject. San Diego.

RAWSON J. PICARD, M.D.

Although it has been on my reading table for some time, it was only the other evening that I found opportunity to read your commentary on "Parapsychology" in the [July-August] issue. Congratulations on a timely and interesting statement. And, I might add, that I am in complete accord with your views. Did I ever tell you of my one brief experience with "extra-sensory phenomena"? If not, remind me sometime and I will connect up that "disappearing hose" with the Parapsychology Laboratory at Duke University. San Francisco.

IAN CAMPBELL

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ERRATA:

Red of face, we confess to some beauts, this volume. Not counting the little ones, some of which we've found, and all of which you the reader have probably found, these are the ones we're admitting to the record:

March-April, pp. 18-20, misplaced lines should read: "There are at the present time seven year-round marine stations along the Pacific Coast . . . Pacific Marine Station, a branch of the College of the Pacific, was founded at Dillon Beach in 1947 but did not open for year-round activity until 1957. Hopkins Marine Station at Pacific Grove is the oldest Marine station on the Pacific Coast." It must have been the repetition that confused both editor and printer.

July-August, "In This Issue"—for Whence the Havasu? read Whence the Havasupai? For 29 read 28.

September-October, p. 3, caption—for 1879 read 1871. For 1958 read 1959. Page 23, caption—for A Honolulu dockside read A Hilo dockside. (Apologies to Hilo C. of C.)



academically speaking

THE ATMOSPHERE was reserved and dignified, but there was an unexpressed feeling of excitement and delight when the newest additions to the California Academy of Sciences, namely the J. W. Mailliard, Jr. Library, the Alice Eastwood Hall of Botany, and the Norman B. Livermore Room, were dedicated on October 27th. The friends of the Academy who gathered to share in the quiet celebration with its happy overtones enjoyed a warm sense of recognition, not only of each other but of what they were about to share—a further extension of the institution so dear to their hearts. Each person could rightfully say to himself, "Isn't this wonderfull I helped do it!"

Brayton Wilbur, a Trustee of the Academy, acted as chairman for the proceedings in lieu of Chairman of the Board, Decker G. McAllister, who was temporarily indisposed. With Mr. Wilbur on the stage of the May Treat Morrison Auditorium were seventeen distinguished guests representing those most closely associated with the final realization of the new facilities, and as any member of the gathered company could plainly see, each was pleased to be there.

Robert Gordon Sproul, President Emeritus of the University of California, was principal speaker of the evening. The following excerpts from his speech, given in the familiar, ringing voice, truly illumine the intrinsic meaning of the evening:

"The Academy has long since deserved and won its present world-wide fame as an educational and scientific center with a reputation for both pioneer efforts and notable achievements; and especially for the stimulus it offers youth to learn the facts of science, to become acquainted with its theories, and to think creatively about its problems yet to be solved. . . . The Academy truly brings to us conveniently an intimate, reliable description in words and

pictures of many of the wonders of the great outdoors, in our own State and elsewhere, and of almost the entire world of science . . . (and) makes available to us, Californians and visitors alike, a greater knowledge and better understanding of man and his physical environment. . . . It is today . . . outstanding among institutions of its kind. By its exhibits, displays and popular publications, it has done much to raise the level of man's understanding of science, and to help him to relate its phenomena to his own experiences and thus improve both his daily living and his prospects of survival. . . .

"The three additions to the Academy's plant . . . have been achieved, *mirabile dictu*, without recourse to public tax monies. This miracle has come to pass because of the deep interest and extraordinary benevolence of individual private citizens, their friends and associates. No single stroke of an official pen made possible the opening of the doors of any one of these superb facilities. The miracle came to pass in each case because of the deep interest of the individuals whose names they bear. . . .

"This dedication ceremony today must be regarded as only one more step—albeit a giant step—in the right direction, toward our ever receding goal. Each of us may, under this prescription, continue to enjoy the effects of the marvelous contagion that has stimulated our predecessors to bring the Academy to the high point it has now attained, some with pennies and some with dollars, but all with right good spirit."

Mr. Wilbur presented a roll of blueprints to His Honor, Mayor George Christopher of San Francisco, which signified the transferance of the new buildings to the people of the City and of the County for their use, their education, and their pleasure.

Then, with the kind of smiles usually saved for birthdays or for Christmas mornings, the assemblage moved from the auditorium into the brand-new, penny-bright rooms in which they could take such justifiable pride. Reserve retreated to the outer atmosphere. H. R.

(LEFT) The Alice Eastwood Hall of Botany.

(RIGHT) Reading room of the J. W. Mailliard, Jr., Library.

(C. A. S. photos by C. E. Crompton)

What we already know about your 1963 car

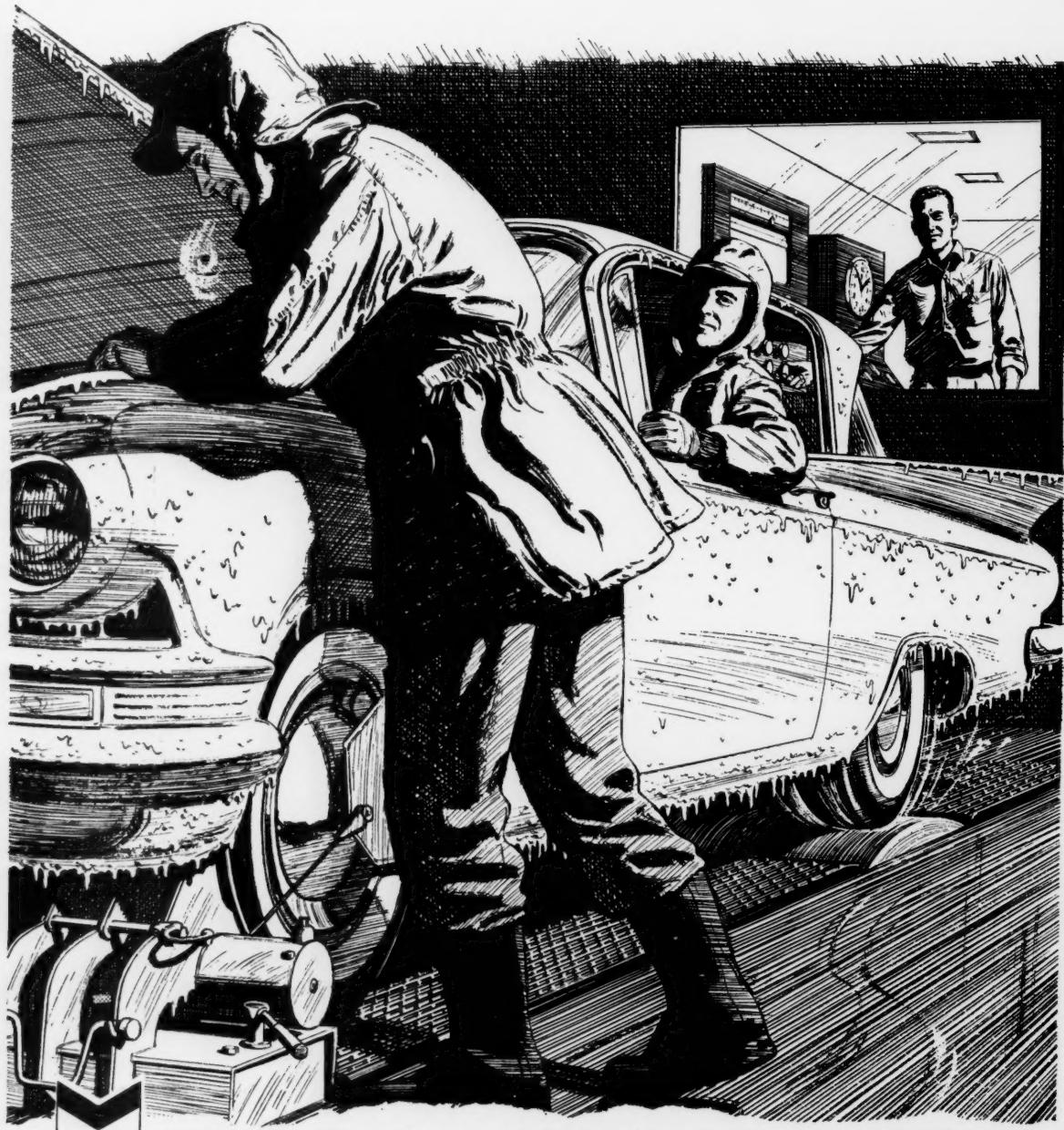
The engine of your 1963 car will be lighter and will give you improved performance . . . including better gasoline mileage.

We know this because Standard's scientists are already developing gasolines of the future. To test them, we use experimental engines installed in current model cars. The engines are obtained from auto makers and modified in our laboratories to match engine design forecasts.

These future fuels get the toughest possible workout — on the road, as well as on this "indoor highway." Here, at the touch of a button, we can create almost any kind

of weather or driving situation a car might encounter. Gasolines are tested at varying speeds and engine loads to simulate mountains, traffic and freeways . . . under climatic conditions ranging from 120° desert heat to 40° below zero cold.

*Your car of the future may never take such punishment. But if it does, we'll be ready with gasolines that will deliver all the power and performance built into its engine. Research that leads to new and improved gasolines is one of the ways **the people at Standard are planning ahead to serve you better.***



STANDARD OIL COMPANY OF CALIFORNIA

